



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/613,203	07/03/2003	Gurtej S. Sandhu	98-0957.01	4599
7590	10/18/2005		EXAMINER MALDONADO, JULIO J	
Charles Brantley Micron Technology, Inc. 8000 S Federal Way Mail Stop 01-525 Boise, ID 83716			ART UNIT 2823	PAPER NUMBER
DATE MAILED: 10/18/2005				

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/613,203

Applicant(s)

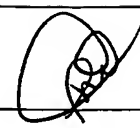
SANDHU ET AL.

Examiner

Julio J. Maldonado

Art Unit

2823



-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 04 August 2005.
2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-13, 52 and 53 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) 1-13, 52 and 53 is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. The rejection of claims 52 and 53 as set forth in Office Action mailed in 05/04/2005 is withdrawn in view of applicants amendments filed in 08/04/2005.
2. A new rejection of claims 52 and 53 is included in this Office Action.
3. Claims 1-13, 52 and 53 are pending in the application.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 1-4 and 8-13 are rejected under 35 U.S.C. 102(e) as being anticipated by Summerfelt et al. (U.S. 6,362,068 B1).

Summerfelt et al. (Figs.1-5) teach a capacitor structure including a bottom electrode layer (30); a first high-dielectric layer (32) contacting said bottom electrode layer (30), wherein said first dielectric layer is selected from the group including strontium titanate or metal-doped strontium titanate (Table 2); a second high dielectric layer (34) selected from the group including barium strontium titanate or metal-doped barium strontium titanate (Table 2); a third high-dielectric layer (32) selected from the group including strontium titanate or metal-doped strontium titanate (Table 2); and a top electrode (46), wherein said first dielectric layer has a first thickness, said second

Art Unit: 2823

dielectric layer has a second thickness and said first thickness is different than said second thickness, said first, second and third dielectric layers form a plurality of dielectric layers (column 3, line 17 – column 6, line 10).

Summerfelt et al. fail to expressly teach wherein at least two layers of said dielectric layer of said plurality exhibit different degrees of oxidation, wherein said second dielectric layer has a lower oxygen concentration than said first dielectric layer or wherein said layers exhibit different amounts of oxygen per unit volume. Summerfelt et al. inherently teach upon these limitations because Summerfelt discloses metal-rich dielectric layers.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 5-7, 52 and 53 are rejected under 35 U.S.C. 103(a) as being unpatentable over Summerfelt et al. (U.S. 6,362,068 B1) as applied to claims 1-4 and 8-13 above, and further in view of the following comments.

Summerfelt et al. (Figs.1-5) teach a capacitor structure including a bottom electrode layer (30); a first high-dielectric layer (32) contacting said bottom electrode layer (30), wherein said first dielectric layer is selected from the group including strontium titanate or metal-doped strontium titanate (Table 2); a second high dielectric layer (34) selected from the group including barium strontium titanate or metal-doped

Art Unit: 2823

barium strontium titanate (Table 2); a third high-dielectric layer (32) selected from the group including strontium titanate or metal-doped strontium titanate (Table 2); and a top electrode (46), wherein said first dielectric layer has a first thickness, said second dielectric layer has a second thickness and said first thickness is different than said second thickness, said first, second and third dielectric layers form a plurality of dielectric layers (column 3, line 17 – column 6, line 10).

Summerfelt et al. fail to expressly teach wherein at least two layers of said dielectric layer of said plurality exhibit different degrees of oxidation, wherein said second dielectric layer has a lower oxygen concentration than said first dielectric layer or wherein said layers exhibit different amounts of oxygen per unit volume. Summerfelt et al. inherently teach upon these limitations because Summerfelt discloses metal-rich dielectric layers.

Summerfelt et al. substantially teach all aspects of the invention but fail to disclose wherein said plurality of dielectric layers defines a thickness at most 200 angstroms; wherein said first dielectric layer has a thickness of at least 10 angstroms; wherein the layers define a total thickness ranging from 50 to 70 angstroms; and wherein at least a lowest layer of said plurality defines an individual thickness of about 20 angstroms. Notwithstanding, it would have been an obvious matter of design choice bounded by well known manufacturing constraints and ascertainable by routine experimentation and optimization to choose these particular dimensions because applicant has not disclosed that the dimensions are for a particular unobvious purpose, produce an unexpected result, or are otherwise critical, and it appears prima facie that

Art Unit: 2823

the process would possess utility using another dimension. Indeed, it has been held that mere dimensional limitations are prima facie obvious absent a disclosure that the limitations are for a particular unobvious purpose, produce an unexpected result, or are otherwise critical. See, for example, *In re Rose*, 220 F.2d 459, 105 USPQ 237 (CCPA 1955); *In re Rinehart*, 531 F.2d 1048, 189 USPQ 143 (CCPA 1976); *Gardner v. TEC Systems, Inc.*, 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), cert. denied, 469 U.S. 830, 225 USPQ 232 (1984); *In re Dailey*, 357 F.2d 669, 149 USPQ 47 (CCPA 1966).

Response to Arguments

8. Applicant's arguments filed 08/04/2005 have been fully considered but they are not persuasive.

The disclosure of SrTiO_x and BaSrTiO_x is a disclosure of metal layers that are fully oxidized. By doping one of the layers with a metal the doped layer would have a lower degree of oxidation because free metal is present in that layer.

Conclusion

9. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

Art Unit: 2823

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.


10. Applicants are encouraged, where appropriate, to check Patent Application Information Retrieval (PAIR) (<http://portal.uspto.gov/external/portal/pair>) which provides applicants direct secure access to their own patent application status information, as well as to general patent information publicly available.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to examiner Julio J. Maldonado whose telephone number is (571) 272-1864. The examiner can normally be reached on Monday through Friday.

12. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Smith, can be reached on (571) 272-1907. The fax number for this group is 571-273-8300. Updates can be found at <http://www.uspto.gov/web/info/2800.htm>.

Julio J. Maldonado
Patent Examiner
Art Unit 2823

Julio J. Maldonado
October 14, 2005


George Fourson
Primary Examiner